

# CHILDHOOD ACUTE LYMPHOCYTIC LEUKEMIA AND ESTIMATED EXPOSURE TO HAZARDOUS AIR POLLUTANTS

**Robert Gunier**, *University of California, School of Public Health, Berkeley, CA, USA*

**Catherine Metayer**, *University of California, School of Public Health, Berkeley, CA, USA*

**Stephen Francis**, *University of California, School of Public Health, Berkeley, CA, USA*

**Peggy Reynolds**, *Cancer Prevention Institute of California, Fremont, CA, USA*

**Patricia Buffler**, *University of California, School of Public Health, Berkeley, CA, USA*

**Background and Aims:** Leukemia is the most common cancer in children and yet there are few established risk factors for the disease. Previous studies evaluating the risk of childhood leukemia associated with exposure to outdoor air pollutants have included all types of leukemia and reported mixed results. Our objective was to evaluate the relationship between childhood acute lymphocytic leukemia (ALL) and estimated exposure to hazardous air pollutants.

**Methods:** We collected residential history information from 630 cases and 984 controls matched on birth date, sex and race/ethnicity enrolled in the Northern California Childhood Leukemia Study (1995-2008). We used a geographic information system to assign residential addresses to census tracts. Corresponding outdoor concentrations for 20 potentially carcinogenic hazardous air pollutants modeled by the USEPA were used to estimate average ambient concentration during the first year of life and from birth to diagnosis/reference date for the matched cases and controls. We used conditional logistic regression to calculate odds ratios based on the interquartile range of the concentrations of individual air pollutants adjusted for household income.

**Results:** In multi-pollutant models, we observed an increased risk of ALL with an increase in estimated average ambient concentrations of methylene chloride, a solvent used in residential and industrial settings, equivalent to the inter-quartile range ( $0.38 \mu\text{g}/\text{m}^3$ ) during the time period from birth to diagnosis date (OR=1.3, 95% CI 1.0 – 1.6). The results were similar for the first year of life. We did not observe significantly elevated odds ratios for estimated exposure to any of the other hazardous air pollutants.

**Conclusions:** Our results suggest that exposure during the first year of life and over lifetime near a child's residence to higher ambient concentrations of methylene chloride are associated with an increased risk of acute lymphocytic leukemia.